Two New Species of Meloidae (Coleoptera) from Mexico

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Two New Species of Meloidae (Coleoptera) from Mexico

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Abstract

Two species of Meloidae from Mexico are described and illustrated. Included are *Epicauta* (*Macrobasis*) *sorjuanae* Pinto, **new species** (Meloinae: Epicautini) from Oaxaca and Puebla, and *Zonitis* (*Neozonitis*) *bolognorum* Pinto, **new species** (Nemognathinae: Nemognathini) from Sonora. Placement of each relative to congeners is discussed.

Key Words: blister beetles, taxonomy, *Epicauta*, *Zonitis*

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North American Meloidae are reasonably well known (Pinto and Bologna 1999). yet there remain distinctive species that have escaped detection. This paper describes two such species from Mexico, a species of *Epicauta* Dejean and one of *Zonitis* Fabricius. As far as can be determined, neither has ever been referred to in the literature either as unknown or as misidentifications of other described taxa.

The genus *Epicauta* (Meloinae: Epicautini) includes two subgenera. The nominate subgenus is widespread throughout much of the world (Pinto and Bologna 1999), and its 102 North American species have been studied in some detail (Pinto 1991). The subgenus *Macrobasis* LeConte, with 73 species distributed from southern Canada to northern South America (Pinto 1991; Campos-Soldini *et al.* 2018), has never been adequately studied. The group is most diverse in southern Mexico. A key to species is available but only treats males (Pinto 1991). *Epicauta sorjuanae* Pinto, **new species**, described herein, is a distinctive addition to *Macrobasis* from Puebla and Oaxaca. It is a member of the Funesta group as defined by Werner (1954) and Pinto (1991). This assemblage of 12 species is restricted to southern Mexico and Central America.

Zonitis (Nemognathinae: Nemognathini) is a relatively large genus with over 100 species assigned and an almost worldwide distribution (Pinto and Bologna 1999; Bologna and Pinto 2002; Bologna *et al.* 2013). Twenty-four species are known from North America (Enns 1956; Pinto 2001; García-París *et al.* 2007; García-París and Ruiz 2009). Enns (1956) divided the North American species in two subgenera, *Parazonitis* Enns and *Neozonitis* Enns. He considered Old World elements distinct but did not detail differences, and definitions of the genus and subgenera remain unsettled (Bologna and Pinto 2002; Bologna *et al.* 2013). Recently, one Asian and 43 Australasian species were transferred from *Zonitis* to other genera (Bologna *et al.* 2013; Pan *et al.* 2018) and it is likely that additional species will require reassignment once relationships in the Nemognathini are better understood.

Zonitis bolognorum Pinto, **new species**, described herein, is assigned to the subgenus *Neozonitis*. Based on current definitions of the North American subgenera, *Parazonitis* includes those species that possess maxillary galeae prolonged into a sucking tube. *Neozonitis* incorporates the remaining species, all of which have unmodified maxillae. There are no other distinctions, and the subgenus lacks any defining derived traits.

Material and Methods

Examined specimens of the new species are housed in the following collections: California Academy of Sciences, San Francisco, CA (**CAS**); Entomological Research Museum, University of California, Riverside, CA (**UCRC**); Essig Museum of Entomology, University of California, Berkeley, CA (**EMEC**); Snow Entomological Museum, University of Kansas, Lawrence, KS (**SEMC**); and University of Arizona Insect Collection, Tucson, AZ (**UAIC**). Collection of deposition is listed with each specimen in the species treatments.

In the descriptions, body length is measured from the occiput to the apex of the elytra. Length and width measurements are maximum dimensions unless indicated. Head length measures the distance from the occiput to the frontoclypeal suture. Certain quantitative data are reported as the mean followed by the range in parentheses. Body length of both species and all data for *Z. bolognorum* are based on all individuals available. Additional data for *E. sorjuanae* represent four of the six specimens unless otherwise indicated.

Results and Discussion

Epicauta (*Macrobasis*) *sorjuanae* Pinto, new species

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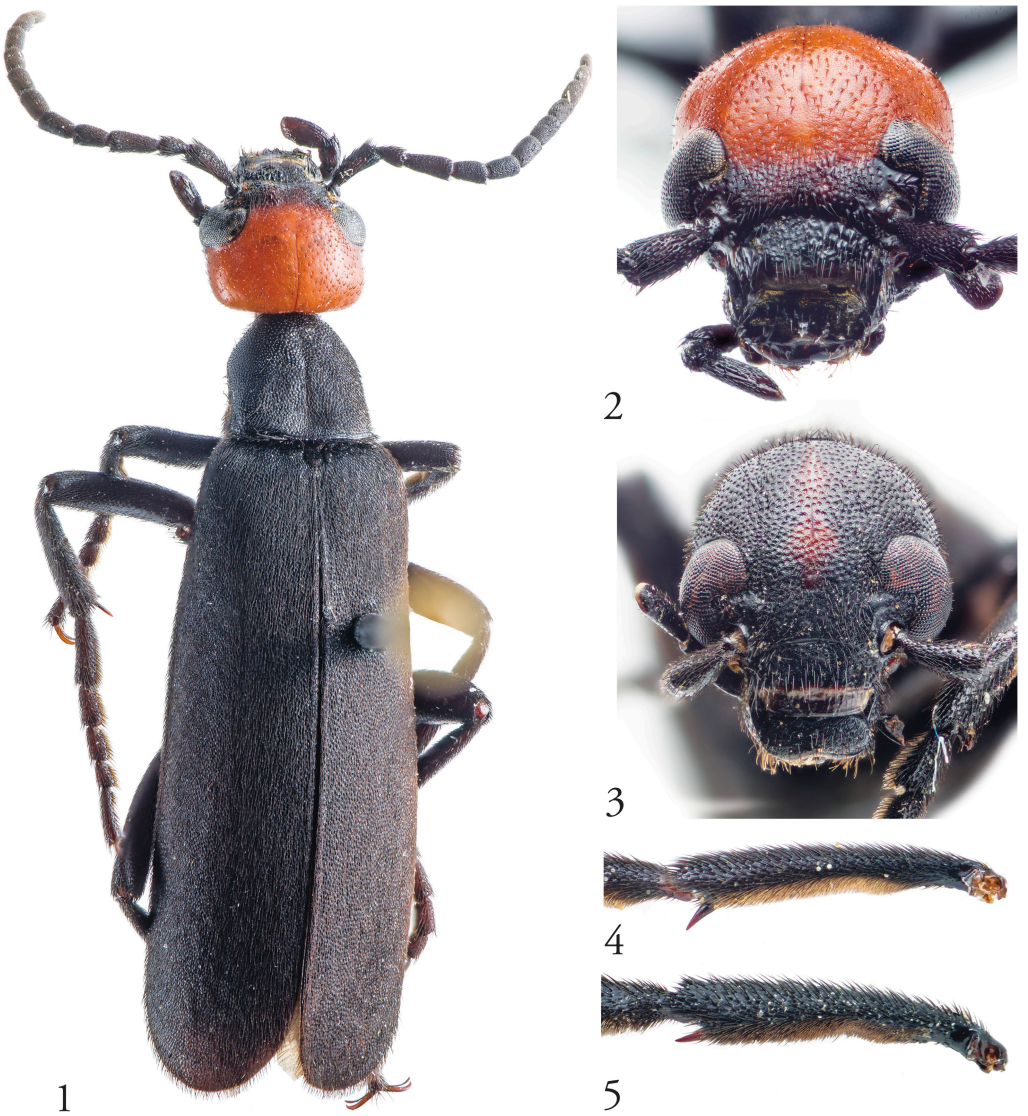
(Figs. 1, 2, 4)

Description. Male. Moderately slender; length = 9–13 mm (mean = 10.3 mm). Black except head capsule orange with black restricted to gula and area between base of antennae and below eyes. Vestiture short, decumbent, dense except on head, dark brown to black, not affecting body color. **Head:** Subquadrate, widest at eyes, length 0.78X (0.75–0.81) width at eyes, 0.83X (0.79–0.88) width immediately above eyes; interocular distance half head width at eyes; head capsule bisected by a fine line extending from vertex to base of occiput; punctures fine, relatively dense on frons, becoming sparser on vertex and occiput, both areas with numerous punctures separated by a distance exceeding their diameter. Eyes moderately bulged, narrowly,



Figs. 1–5. *Epicauta* species. **1)** *E. sorjuanae*, holotype ♂ habitus (body length = 13 mm); **2)** *E. sorjuanae*, head; **3)** *E. atripilis*, head; **4)** *E. sorjuanae*, ♂ protibia; **5)** *E. atripilis*, ♂ protibia.

distinctly emarginate with dorsal lobe much shorter and narrower than ventral lobe, ventral lobe extending to outer margin of maxilla on underside of head, maximum eye width *ca*. 0.40X head length. Antennae moderately robust, subfiliform, tapering slightly to apex, moderately long with apex of antennomere 3 reaching top of head and antennomere 1 very slightly impressed anteroapically; antennomeres subcylindrical with antennomere 2 about half the length of antennomere 3; exserted setae very short, inconspicuous; length/width ratios of antennomeres (in holotype): 40/15, 16/12, 35/16, 23/16, 27/15, 26/15, 26/14, 25/13, 25/13, 24/13, 33/11. Mandibles strongly curved to apex, not extending beyond apex of labrum. Maxillary and labial palpi slightly enlarged, broadened; last maxillary palpomere without setae on ventral surface. **Thorax:** Pronotum subcampaniform, widest across basal margin, length and width subequal [mean length/width ratio = 1.03 (0.98–1.08)], width at apical third 0.92X (0.90–0.96) basal width; disk with shallow median depression at base and obsolescent longitudinal median line; punctures relatively small, very dense, crowded. Wing membrane dark. Protibia unicalcarate; posterior apical spur exserted, curved slightly, anterior apical spur absent; metatibia with a well-developed apical comb of 6 teeth on medial surface; metatibial spurs similar, bladelike, apex acute and slightly pallid; tarsi with light-colored pads ventrally on all segments but restricted to apex of tarsomere 1 on middle and hind legs; tarsomeres 1 and 2 of protarsi subequal in length. **Abdomen:** Last ventrite broadly, shallowly emarginate.

Female. Unknown.

Types. Holotype ♂: **MEXICO:** *Puebla*: Las Peñas, 4.5 mi. SE; ix-5-1972; Byers and Thornhill; deposited in SEMC. Five paratypes: **MEXICO:** *Oaxaca*: Huajuapan, 21 km NW; x-14-1978; E. Giesbert; 1♂; UCRC. Teotitlán, 12.8 mi. S; viii-4-1975; Taylor and Sullivan; 1♂; UCRC. Valerio Trujano; vii-28-1937; 1♂; CAS. Petalcingo; xi-25-1963; A. E. and M. M. Michelbacher; 2♂; EMEC.

Additional Material. Dr. Mario García-París, Museo Nacional de Ciencias Naturales, Madrid, Spain, informed me of the following additional records of *E. sorjuanae*. *Puebla*: San José Axuxco (Petlanco); xi-5-1988; [in the collection of the Universidad Nacional Autónoma de México, Estación de Biología (Chamela]. *Oaxaca*: Cuicatlán, 26 km SSE; 17°36.988'N, 96°55.392'W; x-17-1998 [in the collection of the Universidad Nacional Autónoma de México México, DF]. Dr. García-París provided a photograph of a specimen from San José Axuxco. Requests to the collections involved to borrow this additional material either were not received or went unanswered.

Geographic Distribution. Known only from Puebla and Oaxaca, Mexico.

Seasonal Distribution. Seven records from 4 August 4 to 17 October.

Etymology. Named after Sor Juana Inés de la Cruz, 17th century Mexican nun, scholar, dramatist, and early feminist.

Remarks. Subgeneric placement of *E. sorjuanae* is indicated by the structure of antennomere 1 (arcuate posterior surface) and presence of an apical metatibial comb, two features found only in *Macrobasis* (Selander and Mathieu 1969; Pinto 1991). The single protibial spur and slightly modified antennomere 1 in males as well as the relatively short antennomere 2 best places the new species in the Funesta Group. Within *Macrobasis*, coloration alone separates *E. sorjuanae* from all described species (Fig. 1). The only other North American *Epicauta* with an orange head and remainder of the body black is a form of *Epicauta atrata* (Fabricius) of the nominate subgenus. That species occurs predominantly in eastern USA and extends south only into northeastern Mexico (Tamaulipas, Nuevo León) (Pinto 1991).

Within the Funesta group, *E. sorjuanae* is most similar to *Epicauta atripilis* Champion, also from southern Mexico, and it keys to that species in Pinto (1991). Coloration and certain more subtle features easily separate the two species. The predominantly orange head capsule, fine, relatively sparse punctation on the head (Fig. 2), and in males, the subequal first and second tarsomeres, exserted apical protibial spur (Fig. 4), and slightly enlarged palpi characterize *E. sorjuanae.* In *E. atripilis*, cuticle coloration, including that of the head, is black, punctation on the vertex and occiput is coarser and considerably more dense (Fig. 3), and in males the first tarsomere is distinctly longer than the second, the apical protibial spur is straight (Fig. 5), and the maxillary and labial palpi are unmodified. The male genitalia are similar in both species.

Zonitis (*Neozonitis*) *bolognorum* Pinto, new species

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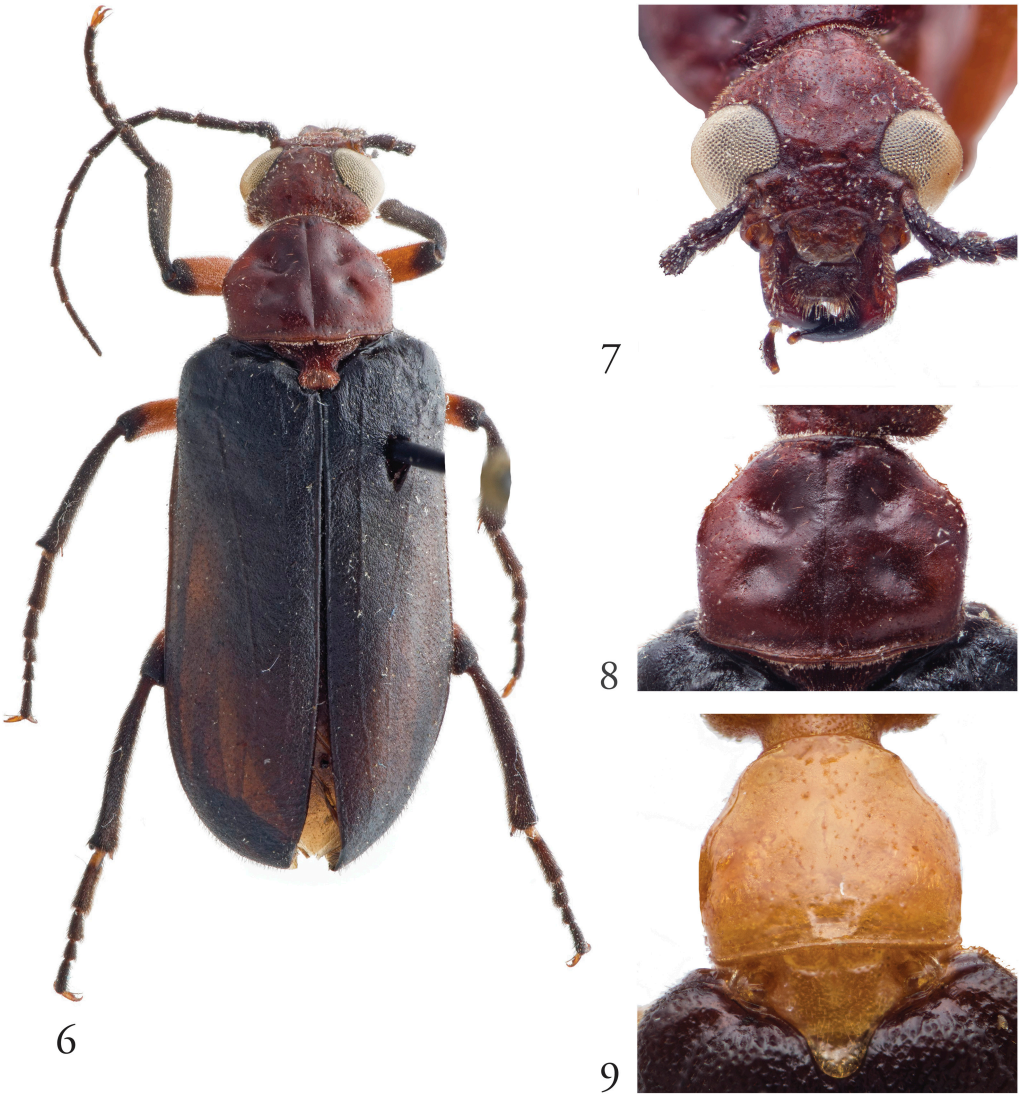
(Figs. 6–8)

Description. Female. Moderately robust, length 11–17 mm (mean = 13.3 mm), width *ca*. 2/5 body length. Head, pronotum, and scutellum orange to brownish red, venter orange, elytra brown to almost black, femora orange except black at apex, eyes, antennae, apex of mandibles, palpi, tibiae, and tarsi black. Setation on dorsum short, inconspicuous, considerably more dense on elytra and scutellum, sparse on head and especially so on pronotum; setation on venter and legs longer, dense except glabrous along midline of metasternum; tarsi densely setose ventrally but not padded; color of all



Figs. 6–9. *Zonitis bolognorum*, holotype ♀ (body length = 17 mm): **6)** Habitus; **7)** Head; **8)** Pronotum. **9)** *Zonitis interpretis*, pronotum.

setae similar to that of underlying cuticle. **Head:** Transversely suboval, widest at eyes, length 0.65X (0.62–0.67) width at eyes, 0.78X (0.71–0.80) width at occiput; mean interocular distance 0.35X (0.33–0.37) maximum head width; occiput broadly arcuate to subsinuate; frons moderately coarsely, densely, obsolescently punctate; punctures sparser and smaller on vertex and occiput; clypeus and labrum wider than long, obsolescently punctate; labrum with elongate, fine setae. Eyes very large, bulged, broadly emarginate behind antennal sockets, extending medially on underside of head well beyond inner margin of maxillae and almost approaching one another; interocular distance on underside of head *ca*. 0.2X interocular distance on frons. Mandibles robust, abruptly curved at almost 90° at mid-length, not extending appreciably beyond labrum when adducted. Maxillae with galeae lobiform, unmodified, short, not extending beyond apex of mandibles, setose apically but not penicillate; last 3 palpomeres subequal in length, last palpomere not expanded to apex. Penultimate labial palpomere distinctly longer than last palpomere as well as all maxillary palpomeres, last palpomere

narrowing to apex. Antennae filiform, elongate, extending to middle of elytra; antennomere 1 broadly arcuate posteriorly; antennomere 3 longer than 4; antennomere 11 longest, 1.6–1.7X length of 10; antennomere 6 *ca*. 3.3X as long as wide; relative length/width ratios of antennomeres (holotype): 43/18, 26/15, 48/16, 43/14, 43/13, 43/13, 43/13, 43/11, 43/10, 40/9, 70/8. **Thorax:** Pronotum subhexagonal, length 0.82X (0.80–0.85) width, 1.12X (1.11–1.13) maximum head width; sides slightly convergent from widest aspect at apical third to base; disk cuticle relatively smooth with scattered, small punctures and pair of relatively large, deep anterolateral and posterolateral foveae (anterior pair obsolescent in specimen from San Carlos Bay) and fine median line extending length of disk. Scutellum narrowing at midlength, apical half with sides subparallel or (in holotype) noticeably expanded to apex. Elytra *ca*. 1.6X width of pronotum, widest slightly posterior to mid-length; surface dull, without distinct punctures, subasperous; margins bordered except at apex, narrowly flanged at basolateral fourth. Legs with pro- and mesotibial spurs narrow, stick-like, blunt apically, relatively short, *ca*. 0.2–0.3X length of tarsomere 1; metatibial spurs similar, short, *ca*. 0.2X length of tarsomere 1, blade-like, more or less flattened dorsoventrally, not expanding apically, apex truncate; claws abruptly curved at apical fifth; metatarsal claw (holotype) with 15 teeth in inner row. **Abdomen:** Ventrite 5 broadly emarginate posteriorly, ventrite 6 barely so.

Male. Unknown.

Types. Three females, all from Sonora, Mexico. Holotype: Moctezuma, 5 mi. W; vii-25-1985; at MV light; G. Bruyea, D. Hawks; deposited in CAS. Two paratypes: Moctezuma, 17 km SW; vii-11/12-1983; UV, 944 m; S. McCleve, P. Jump; UAIC. San Carlos Bay; viii-16-1964; UV light; R. Dickson; UCRC.

Geographic Distribution. Known only from Sonora, Mexico.

Seasonal Distribution. Three records from 11/12 July to 16 August.

Natural History. All specimens were collected at light.

Etymology. Named for Professor Marco Bologna, Universitá degli studi Roma III, foremost authority of Meloidae, as well as his entire family for generosity and hospitality during periods of collaboration in Rome.

Remarks. Considering that males of *Z. bolognorum* are unknown, the rational for assigning this species to *Zonitis* (*Neozonitis*) should be addressed. *Zonitis bolognorum* is characterized by its greatly enlarged eyes and elongate filiform antennae. Within North American Nemognathini, these features also characterize *Pseudozonitis* Dillon (Enns 1956; Pinto 2018). The male traits separating *Pseudozonitis* from *Zonitis*, *i.e*., the recurved gonostyli of the genitalia and the strongly emarginate and medially impressed fifth abdominal ventrite, cannot be evaluated in *Z. bolognorum*. However, several features of the female preclude placement in *Pseudozonitis* but are consistent with *Zonitis.* These include the structure of the antennae, maxillary galeae, and abdominal ventrite 6. In *Pseudozonitis*, antennomere 3 is shorter than 4, the maxillary galeae are penicillate apically and extend slightly beyond the mandibles, and abdominal ventrite 6 typically has a relatively deep U- or V-shaped emargination (Pinto 2018). As is characteristic of *Zonitis*, antennomere 3 is longer than 4 in *Z. bolognorum*, the maxillary galeae do not extend beyond the mandibles and, while setose, are not penicillate apically. Also, as is typical of *Zonitis* females, abdominal ventrite 6 is not deeply emarginate in *Z. bolognorum*. In contrast to *Pseudozonitis,* the more robust body, head and pronotal shape, and overall surface texture all suggest assignment to *Neozonitis* as currently defined. Although enlarged eyes and long filiform antennae are not typical of *Zonitis*, they do occur in one other North American species, *Zonitis* (*Neozonitis*) *interpretis* Enns.

Zonitis bolognorum is unlike any *Zonitis* described. It can be distinguished from all New World *Zonitis* by eye size alone. In no other species do the eyes extend beyond the inner margin of the maxillae and almost approach one another on the underside of the head. In most *Zonitis*, the eyes extend ventrally, at most, to the outer margin of the maxillae.

The most similar species to *Z. bolognorum* is *Z. interpretis*. In both species, overall color is similar, and the antennae are elongate and filiform. In *Z. interpretis*, the eyes also are larger than in congeners but only attain the inner maxillary margin on the underside of the head and remain considerably disjunct from one another. A comparison of interocular distances best illustrates the interspecific difference. In *Z. interpretis*, eye separation on the underside of the head varies 0.5–0.7X the interocular distance on the frons. In *Z. bolognorum*, this ratio is *ca*. 0.2. The two species are distinguished further by body shape, pronotal structure, elytral surface texture, and the metatibial spurs. *Zonitis interpretis* is a considerably more slender species (Pinto 2017, fig. 1). In *Z. interpretis*, the pronotum is as long as wide, and the disk is relatively smooth and shiny (Fig. 9); its elytra are densely punctate. In *Z. bolognorum*, the pronotum is distinctly wider than long, and the disk is relatively dull with two pairs of foveae (Figs. 6, 8); also, its elytra lack punctures. In addition, the outer metatibial spur in *Z. interpretis* is considerably wider than the inner spur (Pinto 2017, figs. 2, 3). In *Z. bolognorum*, not only are both metatibial spurs similar, but they also are considerably shorter than in *Z. interpretis*.

The similarity between *Z. bolognorum* and *Z. interpretis* does not necessarily imply close relationship. Both species have been collected at light and, unlike other North American *Zonitis*, are probably nocturnal. Thus, it is possible that the features in common are convergent. It should be noted that *Pseudozonitis*, the genus that both species superficially resemble, is predominantly nocturnal (Pinto 2018). These traits (larger eyes, elongate filiform antennae) similarly are shared by presumably unrelated nocturnal nemognathines in other parts of the world, namely *Zonitoschema* Péringuey, *Zoltanzonitis* Bologna and Pinto, and certain species of *Australozonitis* Bologna, Turco, and Pinto (Bologna and Pinto 2018).

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